ĐIỀU TRỊ LOẠN NHỊP TRÊN BỆNH NHÂN SUY TIM

PGS. TS. Phạm Nguyễn Vinh
Đại học Y khoa Phạm Ngọc Thạch
Đại học Y khoa Tân Tạo
Bệnh viện Tim Tâm Đức
Viện Tim Tp. HCM

Pham Nguyen Vinh

Các loạn nhịp thường gặp/suy tim

- Rung nhĩ
- Cuồng nhĩ
- Loạn nhịp thất

Nguy cơ rung nhĩ/suy tim

- Rung nhĩ: giảm 20% cung lượng tim
- Rung nhĩ tần số nhanh: tăng suy tim (Tachycardia induced cardiomyopathy)

Các vấn đề hiện nay của rung nhĩ và suy tim

- Suy tim là một đại dịch, do nhiều nguyên nhân
- Rung nhĩ là hội chứng đa cơ chế
- Điều trị suy tim tích cực giúp phòng ngừa xuất hiện rung nhĩ
- Phòng ngừa đột quỵ và suy tim trên bệnh nhân rung nhĩ: rất cần thiết

Tần suất suy tim

- Thế giới: 23 triệu người lớn
- Hoa Kỳ:
  - 5.1 triệu người ≥ 20 tuổi
  - Năm 2030: tần suất tăng 25%

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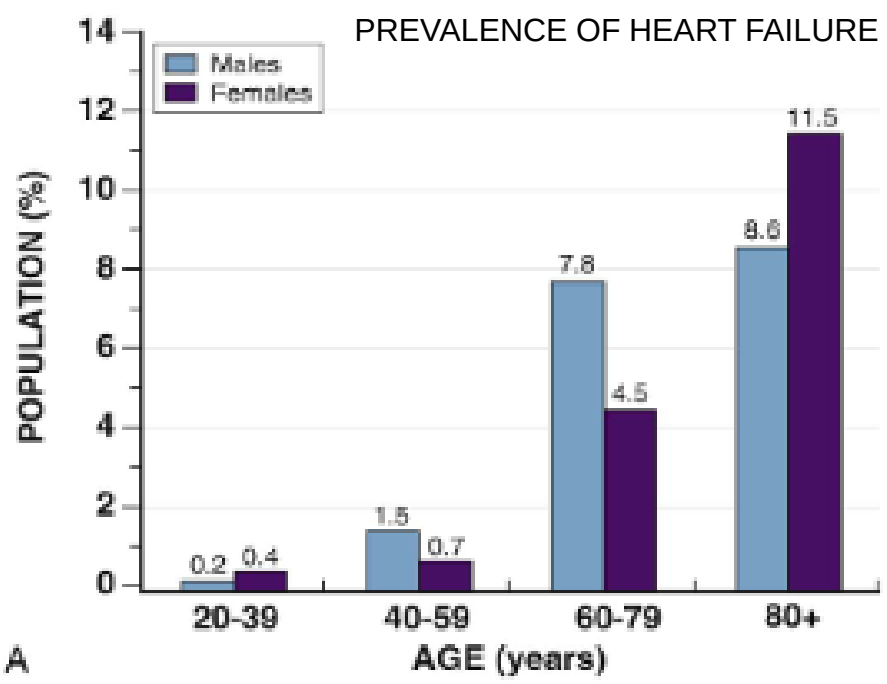
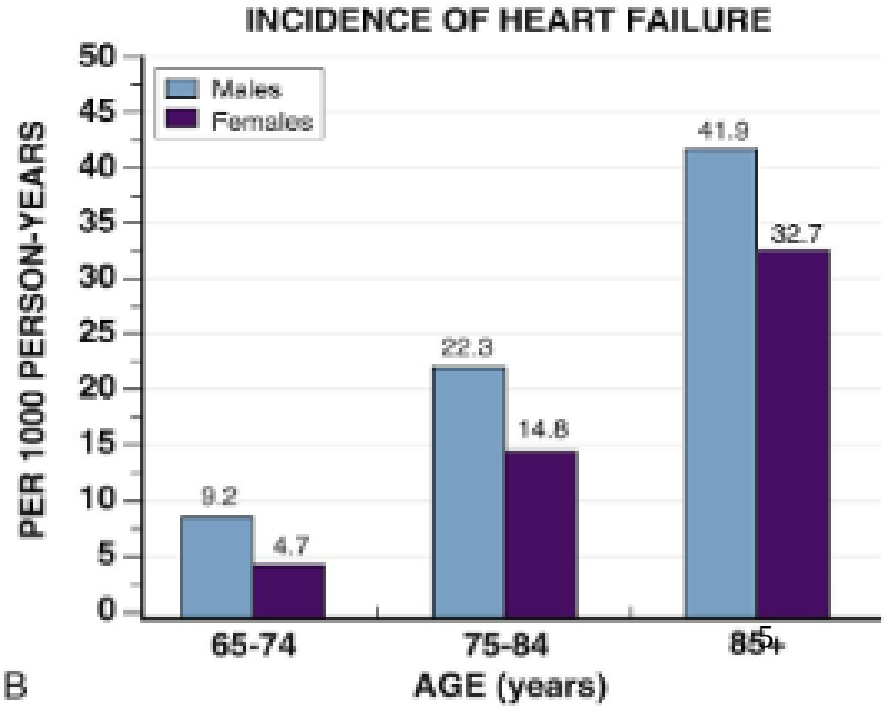
TL: Mann LD. In Braunwald's Heart Disease, 2015, 10th ed, Elsevier- Saunders, p 512-540





Các định nghĩa suy tim tâm thu (HFr EF) và suy tim với phân suất tống máu bảo tồn (HFp EF)

Classification	EF (%)	Description
I. Heart failure with reduced ejection fraction (HF*r*EF)	≤40	Also referred to as systolic HF. Randomized clinical trials have mainly enrolled patients with HF*r*EF, and it is only in these patients that efficacious therapies have been demonstrated to date.
II. Heart failure with preserved ejection fraction (HF*p*EF)	≥50	Also referred to as diastolic HF. Several different criteria have been used to further define HF*p*EF. The diagnosis of HF*p*EF is challenging because it is largely one of excluding other potential noncardiac causes of symptoms suggestive of HF. To date, efficacious therapies have not been identified.
a. HF*p*EF, borderline	41 to 49	These patients fall into a borderline or intermediate group. Their characteristics, treatment patterns, and outcomes appear similar to those of patients with HF*p*EF.
b. HF*p*EF, improved	>40	It has been recognized that a subset of patients with HF*p*EF previously had HF*r*EF. These patients with improvement or recovery in EF may be clinically distinct from those with persistently preserved or reduced EF. Further research is needed to better characterize these patients.

EF indicates ejection fraction; HF, heart failure; HF*p*EF, heart failure with preserved ejection fraction; and HF*r*EF, heart failure with reduced ejection fraction.

TL: Yancy CW et al. 2013 ACCF/AHA Guideline for the Mangement of Heart Failure. DOI: 10.1016/j.jacc.2013.05.019

Định nghĩa Rung nhĩ

Term	Definition
Paroxysmal AF	• AF that terminates spontaneously or with intervention within 7 d of onset. • Episodes may recur with variable frequency.
Persistent AF	• Continuous AF that is sustained >7 d.
Longstanding persistent AF	• Continuous AF of >12 mo duration.
Permanent AF	• Permanent AF is used when there has been a joint decision by the patient and clinician to cease further attempts to restore and/or maintain sinus rhythm. • Acceptance of AF represents a therapeutic attitude on the part of the patient and clinician rather than an inherent pathophysiological attribute of the AF. • Acceptance of AF may change as symptoms, the efficacy of therapeutic interventions, and patient and clinician preferences evolve.
Nonvalvular AF	• AF in the absence of rheumatic mitral stenosis, a mechanical or bioprosthetic heart valve, or mitral valve repair.

AF indicates atrial fibrillation.

Pham Nguyen Vinh

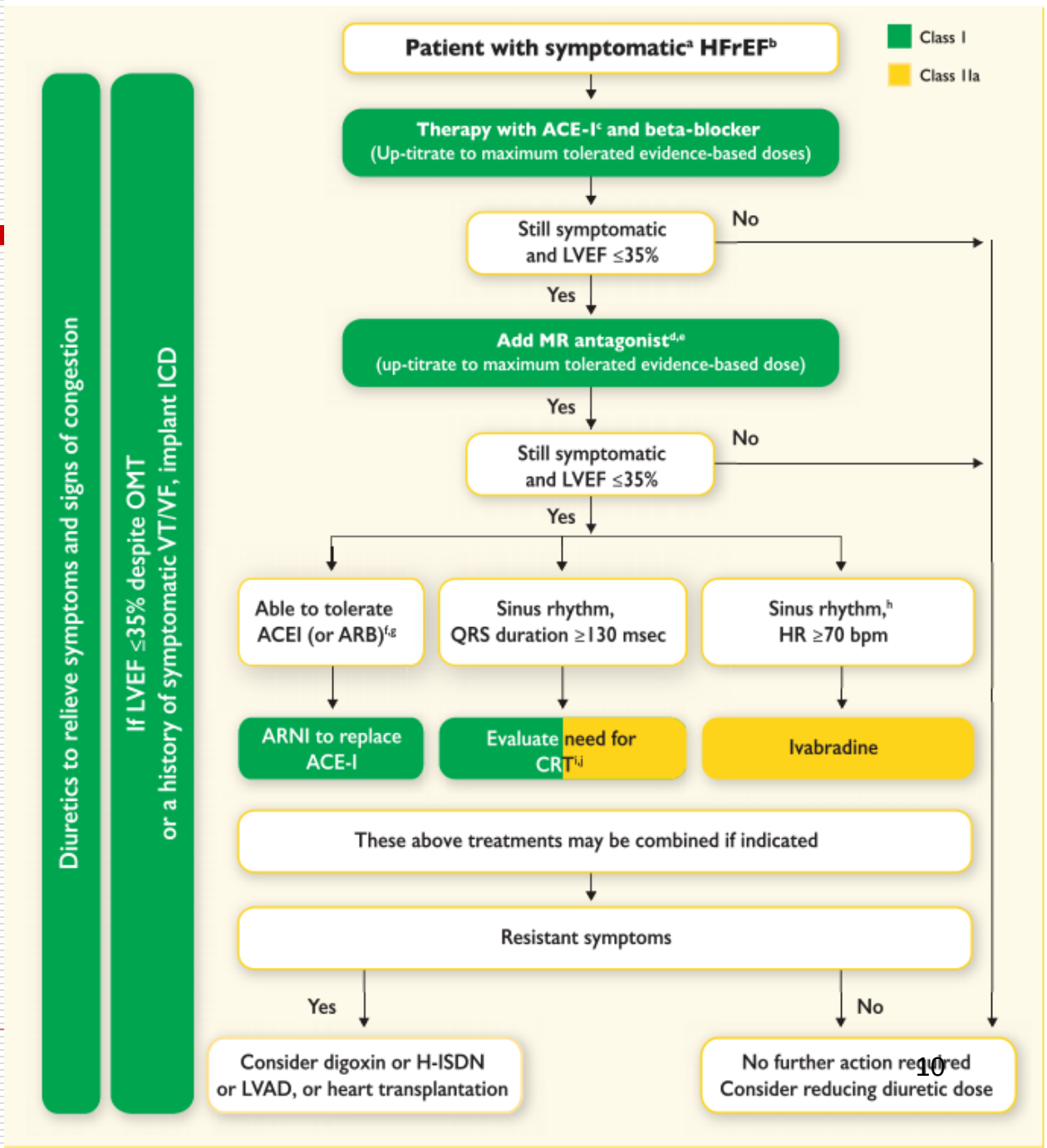
TL: January CT et al, 2014 ACC/AHA/HRS Guideline for the management of Patients with atrial fibrillation. J. Am Coll Cardiol (2014). 03.022

Điều trị suy tim tích cực giúp phòng ngừa rung nhĩ

Mục tiêu điều trị suy tim

- Giảm tử vong
- Giảm nhập viện
- Cải thiện triệu chứng cơ năng, chất lượng cuộc sống

Quy trình điều trị suy tim có t/c cơ năng kèm PXTM giảm



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TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các thuốc được chứng minh kéo dài đời sống/ST PXTM giảm

	Starting dose (mg)	Target dose (mg)
ACE-I		
Captopril[a]	6.25 *t.i.d.*	50 *t.i.d.*
Enalapril	2.5 *b.i.d.*	20 *b.i.d.*
Lisinopril[b]	2.5–5.0 *o.d.*	20–35 *o.d.*
Ramipril	2.5 *o.d.*	10 *o.d.*
Trandolapril[a]	0.5 *o.d.*	4 *o.d.*
Beta-blockers		
Bisoprolol	1.25 *o.d.*	10 *o.d.*
Carvedilol	3.125 *b.i.d.*	25 *b.i.d.*[d]
Metoprolol succinate (CR/XL)	12.5–25 *o.d.*	200 *o.d.*
Nebivolol[c]	1.25 *o.d.*	10 *o.d.*
ARBs		
Candesartan	4–8 *o.d.*	32 *o.d.*
Valsartan	40 *b.i.d.*	160 *b.i.d.*
Losartan[b,c]	50 *o.d.*	150 *o.d.*
MRAs		
Eplerenone	25 *o.d.*	50 *o.d.*
Spironolactone	25 *o.d.*	50 *o.d.*
ARNI		
Sacubitril/valsartan	49/51 *b.i.d.*	97/103 *b.i.d.*
If-channel blocker		
Ivabradine	5 *b.i.d.*	7.5 *b.i.d.*

ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker; ARNI = angiotensin receptor neprilysin inhibitor; b.i.d. = bis in die (twice daily); MRA = mineralocorticoid receptor antagonist; o.d. = omne in die (once daily); t.i.d. = ter in die (three times a day).

[a]Indicates an ACE-I where the dosing target is derived from post-myocardial infarction trials.

[b]Indicates drugs where a higher dose has been shown to reduce morbidity/mortality compared with a lower dose of the same drug, but there is no substantive randomized, placebo-controlled trial and the optimum dose is uncertain.

[c]Indicates a treatment not shown to reduce cardiovascular or all-cause mortality in patients with heart failure (or shown to be non-inferior to a treatment that does).

[d]A maximum dose of 50 mg twice daily can be administered to patients weighing over 85 kg.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các thuốc khác được sử dụng điều trị suy tim PXTM giảm kèm NYHA II- IV (1)

Recommendations	Class [a]	Level [b]	Ref [c]
Diuretics			
Diuretics are recommended in order to improve symptoms and exercise capacity in patients with signs and/or symptoms of congestion.	I	B	178, 179
Diuretics should be considered to reduce the risk of HF hospitalization in patients with signs and/or symptoms of congestion.	IIa	B	178, 179
Angiotensin receptor neprilysin inhibitor			
Sacubitril/valsartan is recommended as a replacement for an ACE-I to further reduce the risk of HF hospitalization and death in ambulatory patients with HFrEF who remain symptomatic despite optimal treatment with an ACE-I, a beta-blocker and an MRA[d]	I	B	162

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các thuốc khác được sử dụng điều trị suy tim PXTM giảm kèm NYHA II- IV (2)

If-channel inhibitor			
Ivabradine should be considered to reduce the risk of HF hospitalization and cardiovascular death in symptomatic patients with LVEF ≤35%, in sinus rhythm and a resting heart rate ≥70 bpm despite treatment with an evidence-based dose of beta-blocker (or maximum tolerated dose below that), ACE-I (or ARB), and an MRA (or ARB).	IIa	B	180
Ivabradine should be considered to reduce the risk of HF hospitalization and cardiovascular death in symptomatic patients with LVEF ≤35%, in sinus rhythm and a resting heart rate ≥70 bpm who are unable to tolerate or have contra-indications for a beta-blocker. Patients should also receive an ACE-I (or ARB) and an MRA (or ARB).	IIa	C	181
ARB			
An ARB is recommended to reduce the risk of HF hospitalization and cardiovascular death in symptomatic patients unable to tolerate an ACE-I (patients should also receive a beta-blocker and an MRA).	I	B	182
An ARB may be considered to reduce the risk of HF hospitalization and death in patients who are symptomatic despite treatment with a beta-blocker who are unable to tolerate an MRA.	IIb	C	-

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các thuốc khác được sử dụng điều trị suy tim PXTM giảm kèm NYHA II- IV (3)

Recommendations	Class [a]	Level [b]	Ref [c]
Hydralazine and isosorbide dinitrate			
Hydralazine and isosorbide dinitrate should be considered in self-identified black patients with LVEF ≤35% or with an LVEF <45% combined with a dilated LV in NYHA Class III–IV despite treatment with an ACE-I a beta-blocker and an MRA to reduce the risk of HF hospitalization and death.	IIa	B	183
Hydralazine and isosorbide dinitrate may be considered in symptomatic patients with HFrEF who can tolerate neither an ACE-I nor an ARB (or they are contra-indicated) to reduce the risk of death.	IIb	B	184
Other treatments with less-certain benefits			
Digoxin			
Digoxin may be considered in symptomatic patients in sinus rhythm despite treatment with an ACE-I (or ARB), a beta-blocker and an MRA, to reduce the risk of hospitalization (both all-cause and HF-hospitalizations).	IIb	B	185
N-3 PUFA			
An n-3 PUFA[e] preparation may be considered in symptomatic HF patients to reduce the risk of cardiovascular hospitalization and cardiovascular death.	IIb	B	186

ACEI = angiotensin-converting enzyme inhibitor; ARB = angiotensin receptor blocker; BNP = B-type natriuretic peptide; bpm = beats per minute; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; LVEF = left ventricular ejection fraction; MRA = mineralocorticoid receptor antagonist; NT-proBNP = N-terminal pro-B type natriuretic peptide; NYHA = New York Heart Association; PUFA = polyunsaturated fatty acid. OMT = optimal medical therapy (for HFrEF this mostly comprises an ACEI or sacubitril/valsartan, a beta-blocker and an MRA).

[a]Class of recommendation.

[b]Level of evidence.

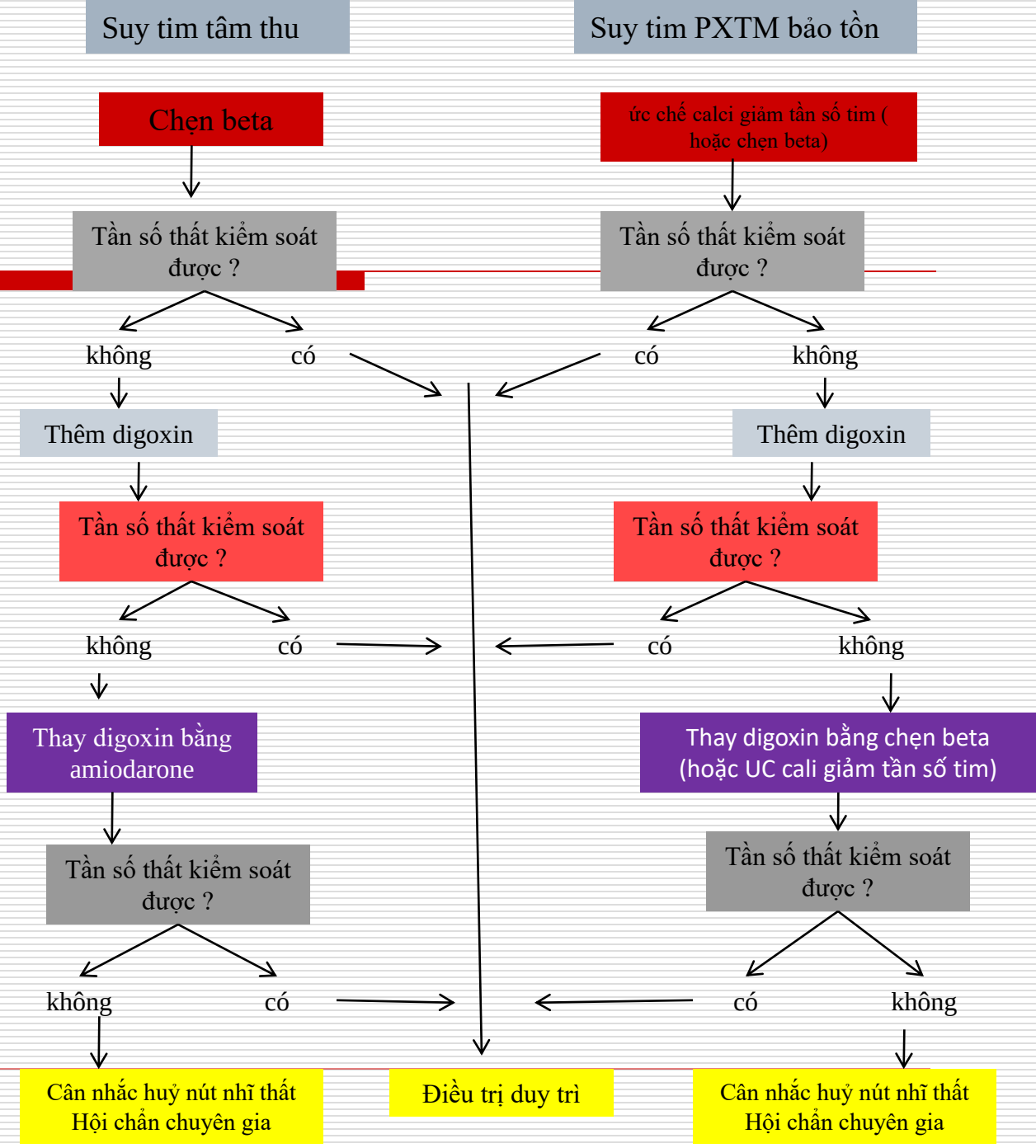
[c]Reference(s) supporting recommendations.

[d]Patient should have elevated natriuretic peptides (plasma BNP ≥150 pg/mL or plasma NT-proBNP ≥600 pg/mL, or if HF hospitalization within the last 12 months, plasma BNP ≥100 pg/mL or plasma NT-proBNP ≥400 pg/mL) and able to tolerate enalapril 10 mg *b.i.d.*

[e]Applies only to preparation studied in cited trial.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Kiểm soát tần số thất/b/n suy tim có kèm rung nhĩ



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TL: McMurray JJV et al. Euro. H. Journal (2012); 33: 1787-1847

Khuyến cáo kiểm soát nhịp/RN kèm NYHA II-IV kèm RLCN thất trái và không mất bù cấp

Recommendations	Class [a]	Level [b]	Ref [c]
Electrical cardioversion or pharmacological cardioversion with amiodarone may be considered in patients with persisting symptoms and/or signs of HF, despite OMT and adequate control of ventricular rate, to improve clinical/symptomatic status.	IIb	B	344
AF ablation may be considered in order to restore sinus rhythm to improve symptoms in patients with persisting symptoms and/or signs of HF, despite OMT and adequate control of ventricular rate, to improve clinical/symptomatic status.	IIb	B	279, 363
Amiodarone may be considered prior to (and following) successful electrical cardioversion to maintain sinus rhythm.	IIb	B	342, 360
Dronedarone is not recommended because of an increased risk of hospital admissions for cardiovascular causes and an increased risk of premature death in NYHA Class III–IV patients.	III	A	247, 347
Class I antiarrhythmic agents are not recommended because of an increased risk of premature death.	III	A	248, 364, 365

AF = atrial fibrillation; HF = heart failure; NYHA = New York Heart Association, OMT = optimal medical therapy.
Patients should generally be anticoagulated for 6 weeks prior to electrical cardioversion.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Khuyến cáo phòng ngừa huyết khối thuyên tắc/ suy tim có TC/CN kèm RN

Recommendations	Class [a]	Level [b]	Ref [c]
The CHA_2DS_2-VASc and HAS-BLED scores are recommended tools in patients with HF for the estimation of the risk of thromboembolism and the risk of bleeding associated with oral anticoagulation, respectively.	I	B	376, 377
An oral anticoagulant is recommended to prevent thrombo-embolism for all patients with paroxysmal or persistent/permanent AF and a CHA_2DS_2-VASc score ≥2, without contra-indications, and irrespective of whether a rate or rhythm management strategy is used (including after successful cardioversion).	I	A	372–375, 378, 379
NOAC treatment is contra-indicated in patients with mechanical valves or at least moderate mitral stenosis.	III	B	380
In patients with AF of ≥48 h duration, or when the duration of AF is unknown, an oral anticoagulant is recommended at a therapeutic dose for ≥3 weeks prior to electrical or pharmacological cardioversion.	I	B	
Intravenous heparin or LMWH and TOE guided strategy is recommended for patients who have not been treated with an anticoagulant dose for ≥3 weeks and require urgent electrical or pharmacological cardioversion for a life threatening arrhythmia.	I	C	
Combination of an oral anticoagulant and an antiplatelet agent is not recommended in patients with chronic (>12 months after an acute event) coronary or other arterial disease, because of a high-risk of serious bleeding. Single therapy with an oral anticoagulant is preferred after 12 months.	III	C	
For patients with HF and non-valvular AF eligible for anticoagulation based on a CHA_2DS_2-VASc score, NOACs rather than warfarin should be considered for anticoagulation as NOACs are associated with a lower risk of stroke, intracranial haemorrhage and mortality, which outweigh the increased risk of gastrointestinal haemorrhage.	IIa	B	367

AF = atrial fibrillation; CHA_2DS_2-VASc = Congestive heart failure or left ventricular dysfunction, Hypertension, Age ≥ 75 (doubled), Diabetes, Stroke (doubled)-Vascular disease, Age 65–74, Sex category (female); HAS-BLED = Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile international normalized ratio, Elderly (>65 years), Drugs/alcohol concomitantly (1 point each); HF = heart failure; LMWH = low molecular weight heparin; NOAC = non-vitamin K antagonist oral anticoagulant; NYHA = New York Heart Association; TOE = transoesophageal echocardiography.

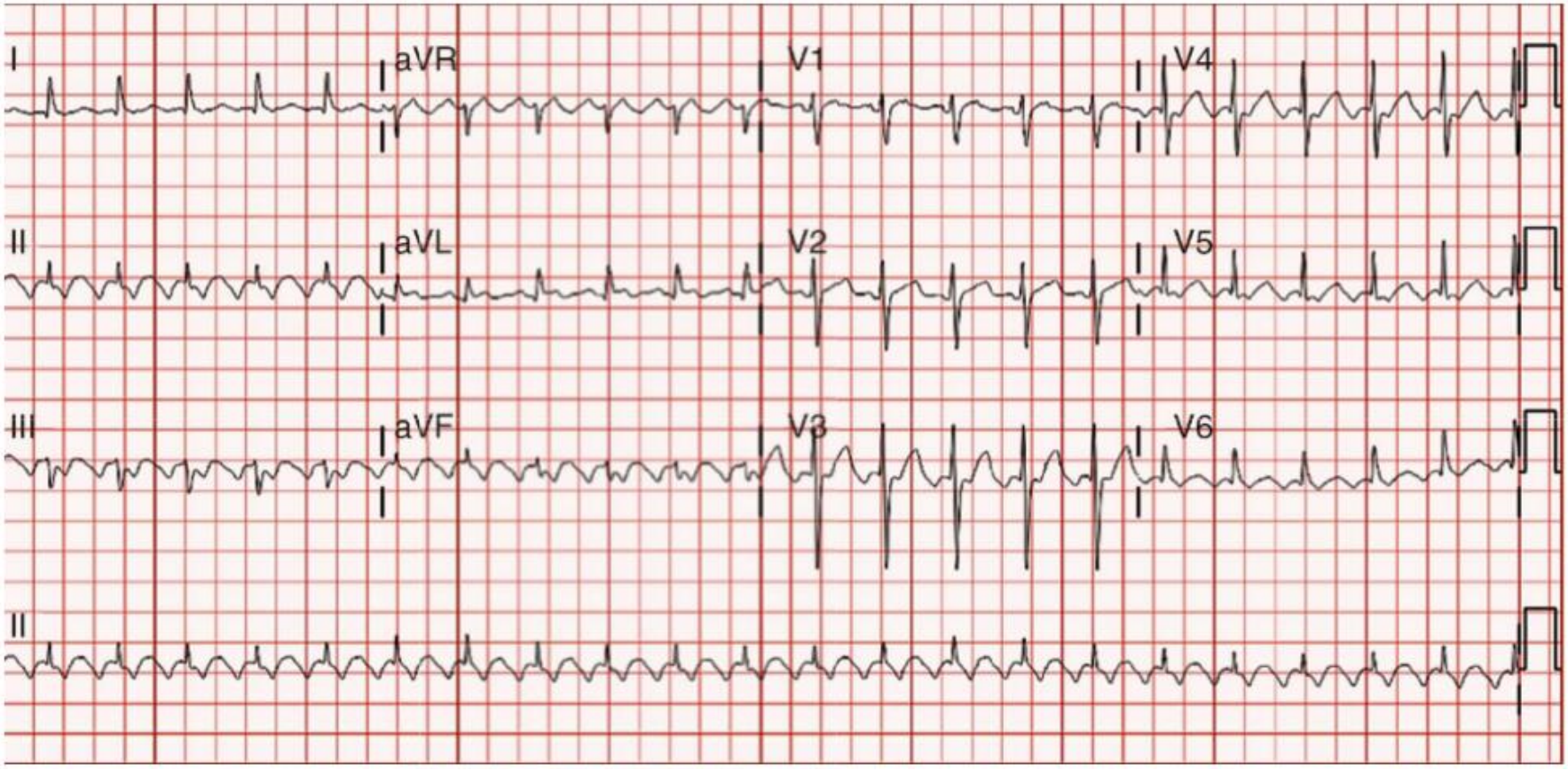
[a]Class of recommendation.

[b]Level of evidence.

[c]Reference(s) supporting recommendations.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Cuồng nhĩ



TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

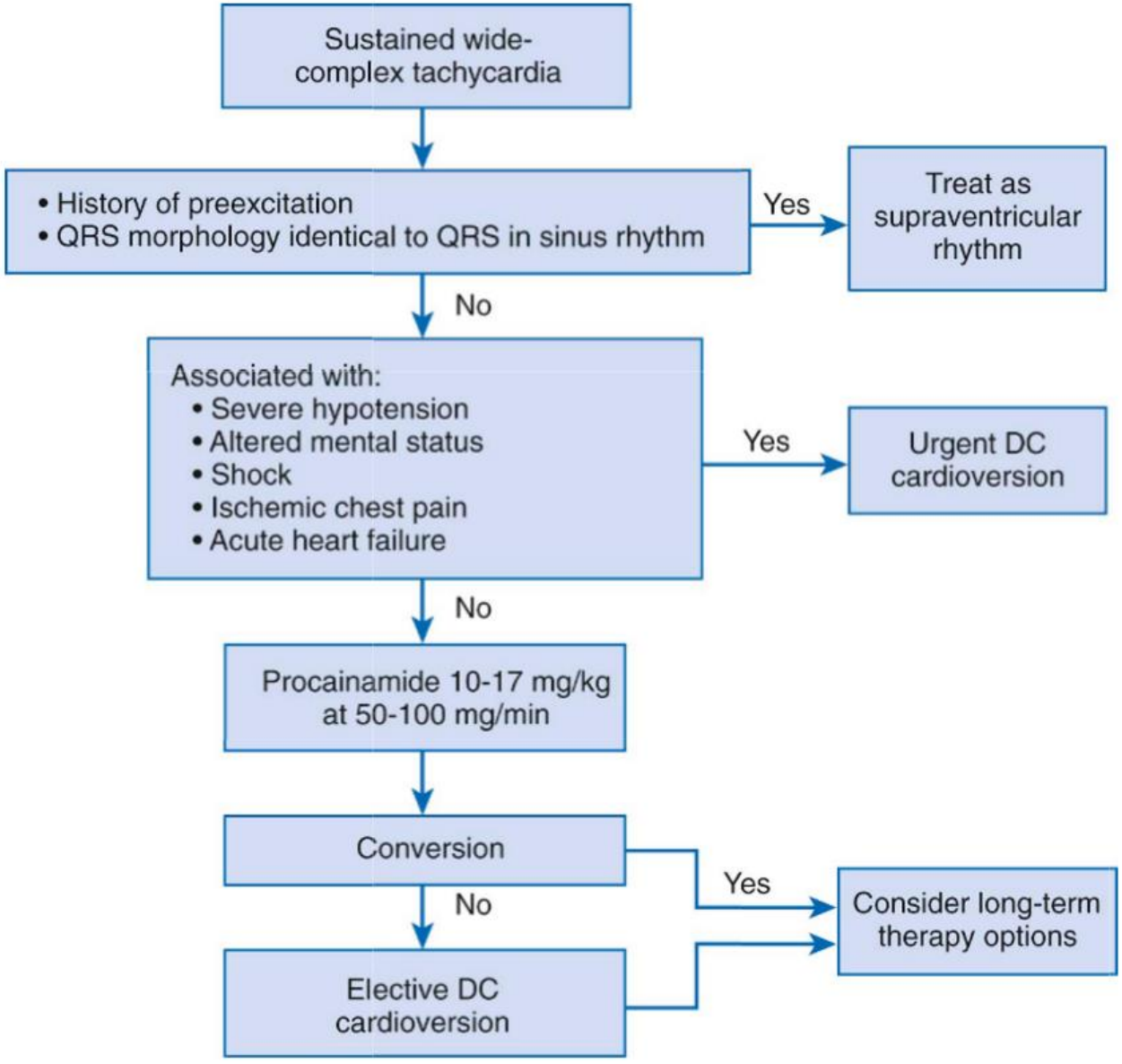
Xử trí cuồng nhĩ

- Nguy cơ cho tim: tương tự RN
- Triệt phá bằng RF: an toàn và hiệu quả/hầu hết b/n

Loạn nhịp thất/suy tim

- Thường gặp
- Nguy cơ: đột tử
- ICD: giúp phòng ngừa tiên phát và thứ cấp

Quy trình xử trí cơn cấp của Nhịp nhanh thất đơn dạng kéo dài (Sustained Monomorphie Ventricular Tachycardia)



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Sustained VT > VT > 30 see

TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Xử trí NNT không kéo dài (<30 giây) /suy tim

- Nghiên cứu SCD- HeFT (2004):
  - Amiodarone không hơn placebo/NYHA II
  - Tử vong nhóm amiodarone > placebo/NYHA III
- Nghiên cứu phân tích tổng hợp (15 n/c)
  - Amiodarone phòng ngừa: không giảm tử vong
- Triệt phá NTT thất và NNT: cải thiện TC/CN

TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

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Phòng ngừa đột tử/suy tim

- Đột tử: tật bệnh và tử vong chính/b/n suy tim
- Nghiên cứu MERIT-HF:
  - 64% đột tử/NYHA II
  - Đột tử: 59% NYHA III
    33% NYHA IV
- Nghiên cứu ATLAS:
  - 3164 b/n ST vừa đến nặng
  - Theo dõi 36-60 tháng
  - Tử vong 1382 cases (43.7%)
  - Phẫu nghiệm tử thi 188 b/n: 54% đột tử do HC/ĐMV cấp

TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Điều trị bằng thuốc/NNT mạn/suy tim

- ICD: phòng đột tử
- Thuốc: giúp giảm số lần sốc điện
- Nghiên cứu Pacifico và c/s:
  - 302 b/n – có ICD
  - Nhóm sotalol (160-320 mg/ng)
  - Nhóm placebo
  - Nhóm sotalol: giảm 48% tiêu chí chính (tử vong mọi nguyên nhân; sốc điện đầu tiên)
- Amiodarone: giảm số lần sốc điện, nhưng tăng tử vong

TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Triệt phá NTT/ sóng tần số radio

- Điều trị phụ trợ/b/n đặt ICD
- Chỉ định:
  - Giảm số lần sốc điện
  - Điều trị NTT thất dầy, ảnh hưởng chức năng tim
- Kỹ thuật: triệt phá từ nội mạc hay thượng mạc

TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Điều trị bằng dụng cụ

- ICD (Implantable Cardioverter Defibrillator)
- CRT-D: (Cardiac Resynchronization Therapy- Defibrillator)

Phòng ngừa tiên phát và thứ cấp bằng máy phá rung cấy được ICD (1)

TRIAL	RANDOMIZATION	YEAR	PATIENTS	ENTRY CRITERIA	MORTALITY RISK REDUCTION WITH ICD
Primary Prevention ICD Trials					
MADIT[62]	ICD vs. medical therapy	1996	196	NYHA I-II with prior MI and LVEF ≤ 35% with inducible VT	0.46 (*P* = 0.009)
CABG-PATCH[64]	Epicardial ICD vs. no ICD	1997	900	LVEF ≤ 35% with abnormal SAECG and CABG	1.07 (*P* = 0.64)
MADIT II[63]	ICD vs. no ICD	2002	1232	NYHA class I-III with LVEF ≤ 30% post MI	0.69 (*P* = 0.016)
DINAMIT[66]	ICD or no ICD (<40 days after MI)	2004	674	Up to 40 days post MI with LVEF ≤ 35%	1.08 (*P* = 0.78)
DEFINITE[65]	ICD vs. no ICD	2004	458	Nonischemic heart failure patients, LVEF <36% with >10 PVCs/hr or NSVT	0.65 (*P* = 0.08)

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Phòng ngừa tiên phát và thứ cấp bằng máy phá rung cấy được ICD (2)

TRIAL	RANDOMIZATION	YEAR	PATIENTS	ENTRY CRITERIA	MORTALITY RISK REDUCTION WITH ICD
SCD-HeFT[58]	ICD vs. amiodarone vs. placebo	2005	2521	NYHA II-III and LVEF ≤ 35%; ischemic or nonischemic	0.77 (*P* = 0.007)
IRIS[67]	Randomized to ICD vs. no ICD	2009	898	Up to 31 days post MI with LVEF ≤ 40%, NSVT or HR >90	1.04 (*P* = 0.78)
Secondary Prevention ICD Trials					
AVID[59]	ICD vs. amiodarone	1997	1016	VF arrest or VT and syncope with EF ≤ 40%	0. 73 (*P* <0.02)
CIDS[60]	Amiodarone vs. ICD	2000	696	VF/VT arrest or syncope	0. 70 (*P* = 0.l42)
CASH[61]	ICD vs. amiodarone vs. metoprolol	2000	346	VT/VF arrest	0.61 (*P* = 0.2)

CABG, Coronary artery bypass graft; *EF*, ejection fraction; *HR*, hazard ratio; *ICD*, implantable cardioverter-defibrillator; *LVEF*, left ventricular ejection fraction; *MI*, myocardial infarction; *NSVT*, nonsustained ventricular tachycardia; *NYHA*, New York Heart Association; *PVC*, premature ventricular contraction; *SAECG*, single-averaged electrocardiography; *VF*, ventricular fibrillation; *VT*, ventricular tachycardia.

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TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Một số nghiên cứu điều trị suy tim bằng tái đồng bộ tim (1)

TRIAL	RANDOMIZATION	YEAR	PATIENTS	ENTRY CRITERIA	CRT OUTCOMES
MIRACLE[89]	CRT vs. OMT, 6 mo	2002	453	NYHA class III-IV and LVEF ≤ 35% with QRS ≥ 130	Improved NYHA class, LVEF, QoL, and 6MWD; reduced LVEDD and MR
MIRACLE-ICD[92]	CRT-D vs. ICD, 6 mo	2003	369	NYHA class III-IV and LVEF ≤ 35% with QRS ≥ 130	Improved, NYHA class, QoL, and peak Vo_2
CONTAK-CD[93]	CRT-D vs. ICD, 6 mo	2003	490	NYHA class II-IV with LVEF ≤ 35% and QRS ≥ 120	Improved 6MWD, NYHA class, QoL, and LVEF with reduced LV volume
COMPANION[94]	OMT vs. CRT-P or vs. CRT-D, 15 mo	2004	1520	NYHA class III-IV with LVEF ≤ 35% and QRS ≥ 120	Reduced all-cause mortality and hospitalization

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TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Một số nghiên cứu điều trị suy tim bằng tái đồng bộ tim (2)

TRIAL	RANDOMIZATION	YEAR	PATIENTS	ENTRY CRITERIA	CRT OUTCOMES
CARE-HF[72]	OMT vs. CRT-P, 29.4 mo	2005	813	NYHA class III-IV with LVEF ≤ 35% and QRS ≥ 120	Reduced all-cause mortality and hospitalization; improved NYHA class and QoL
REVERSE[95]	CRT-ON vs. CRT-OFF, 12 mo	2008	610	NYHA class I-II with LVEF ≤ 40% and QRS ≥ 120	CRT did not reduce all-cause mortality but reduced LVESV index and hospitalization*
MADIT-CRT[87]	CRT-D vs. ICD, 12 mo	2009	1820	NYHA class I-II with LVEF ≤ 30% and QRS ≥ 130	34% reduction in the risk of death or heart failure events*
RAfT[96]	CRT-D vs. ICD, 40 mo	2010	1798	NYHA class II-III with LVEF ≤ 30% and QRS ≥ 120	Reduced all-cause mortality and hospitalization

6MWD, Six-minute walk distance; *CRT-D*, cardiac resynchronization therapy defibrillator; *CRT-P*, cardiac resynchronization therapy pacemaker; *GDMT*, guideline-directed medical therapy; *ICD*, implantable cardioverter-defibrillator; *LVEDD*, left ventricular end-diastolic dimension; *LVEF*, left ventricular ejection fraction; *LVESV*, left ventricular end-systolic volume; *MR*, mitral regurgitation; *NYHA*, New York Heart Association; *OMT*, optimal medical therapy; *QoL*, quality of life.

Pham Nguyen Vinh

TL: Porterfield CP, Dimarco JP. In Heart Failure, 3rd ed, 2016, Elsevier, p. 565-582

Pham Nguyen Vinh

Kết luận

- Điều trị loạn nhịp trên thất/ suy tim:
  - Thuốc
  - Triệt phá
  - Sống chung
- Điều trị loan nhịp thất/suy tim:
  - ICD
  - CRT; CRT-D
  - Thuốc, phụ trợ
  - Triệt phá, phụ trợ